

OPEN+ Data-Driven Grid Cohort

PROJECT DESCRIPTIONS

ABB Inc. – Cary, NC

Economical Data-fused Grid Edge Processor (EDGEPRO) for Future Distribution Grid Control Applications – \$2,302,897

ABB Inc. will design a low-cost, secure, and flexible next-generation grid service platform to improve grid efficiency and reliability. This technology will merge advanced edge computing, data fusion and machine learning techniques for virtual metering, and a central repository for grid applications such as distributed energy resource (DER) control and others on one platform. The united platform will consist of four functional layers: (1) communication including data collection and exchange (2) data processing and distributed state estimation; (3) data standardization and storage; and (4) hosted grid applications designed to enable large-scale deployment of DERs and more flexible grid control. ABB's approach will improve grid reliability and create a more secure platform for grid operators that can integrate and exploit emerging technologies on the grid edge.

GridBright, Inc. – Alamo, CA

Secure Grid Data Exchange Using Cryptography, Peer-to-Peer Networks, and Blockchain Ledgers – \$2,500,000

GridBright, Inc. will develop a simple and secure solution for sharing grid data to improve electric grid efficiency, reliability, and resiliency in a manner that preserves security and integrity. GridBright will use the Agile development model to construct several proof-of-concept software pipelines. They will perform penetration and compromise testing on each pipeline, and carry out a quantitative evaluation of each against requirements and technical and legal standards. The solution will increase the cyber security and resiliency of the electric grid and create a simpler secure grid data exchange process.

Pacific Northwest National Laboratory – Richland, WA

High-Performance Adaptive Deep-Reinforcement-Learning-based Real-Time Emergency Control (HADREC) to Enhance Power Grid Resilience in Stochastic Environments – \$3,500,000

Pacific Northwest National Laboratory (PNNL) will construct an intelligent, real-time emergency control system to help safeguard the U.S. electric grid by providing effective and fast control actions to system operators in response to large contingencies or extreme events. PNNL's scalable platform will utilize advanced machine learning techniques (deep-meta-reinforcement learning) as well as high-performance computing to automatically provide effective emergency control strategies seconds after disturbances or attacks. The technology will diminish the need for costly preventive security measures as well as reduce action time sixtyfold and system recovery time by at least 10%, enabling more efficient and resilient grid operation.

PingThings, Inc. – El Segundo, CA

A National Infrastructure for Artificial Intelligence on the Grid – \$6,250,000

PingThings, Inc. will develop a national infrastructure for artificial intelligence (AI) on the power grid through a three-part effort. First is a scalable, cloud-based platform to store, process, and analyze grid sensor data. Second is the deployment of grid sensors that captures both wide-scale and localized grid behavior, as well as the establishment of a secure data exchange mechanism. Third is the development of a diverse research community through focused educational content, online code sharing, and programming and AI competitions. The project's goal is to accelerate the development of machine learning- and AI-based use cases to improve grid operation and analysis.